

You are here: [Home](#) > [UFRGS](#) > [News and Information](#) > [Researchers seek alternative treatment for childhood cancer](#)

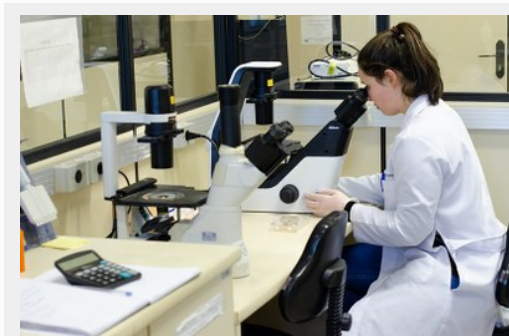
## Researchers seek alternative treatment for childhood cancer

**Conducted in a partnership between UFRGS, the Childhood Cancer Institute and Canadian institutions, study proposes a way to inhibit the proliferation process of cancer cells of the medulloblastoma type**

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Reporting: *Mariana Bier*

According to the National Cancer Institute (Inca), about 30 cases of childhood cancer are diagnosed daily in Brazil. Among the diseases, cancer is the main cause of death among children and adolescents; and, among the types of cancer that occur in this age group, about 20% affect the brain. Currently, procedures such as radiotherapy and chemotherapy are used to treat the disease. They may, however, be harmful when applied to children, since there is a risk of triggering problems in the brain development process. Unlike what happens with adults, children's organisms are still in the maturation stage. Therefore, large exposures to chemicals, such as radiation, may cause hormonal changes and even physical damage in this age group. The search for a new form of treatment for childhood cancer that is better tolerated by young children is extremely important for the advancement of medicine, and this is what is proposed by a study carried out by the UFRGS' Experimental Research Center in collaboration with the Childhood Cancer Institute (ICA), the University of Toronto and the Hospital for Sick Children (Toronto, Canada).



The research was developed at the Cancer and Neurobiology Laboratory of Hospital de Clínicas from Porto Alegre – Photo: Secom / UFRGS

The article "Antitumor activities and cellular changes induced by TrkB inhibition in medulloblastoma", published in June in the scientific journal *Frontiers in Pharmacology*, discusses about the inhibiting protein that triggers the cell multiplication process – one of the biggest problems in the treatment of cancer. The work is part of [Amanda Thomaz's](#) doctoral thesis, developed in the Graduate Program in Cellular and Molecular Biology at UFRGS and supervised by [Rafael Roesler](#), Professor of the Department of Pharmacology and Executive Vice President for Research at UFRGS.

The idea for the research came up in 2010 and was first thought for cervical tumors in adults. It then progressed to childhood tumors, focusing on a specific type called medulloblastoma. The most common type of brain cancer among children, medulloblastoma begins in the cerebellum region, which is in the lower back of the brain. "Childhood cancer is different from adult cancer, because this latter may be explained by biological damage accumulated for a long time in the cell, whereas childhood cancer may not, it can be an embryonic or genetic modification," explains Roesler.

### How the research was done

The study was divided into two parts. [Mariane da Cunha Jaeger](#), doctoral student at the Graduate Program in Cell Biology at UFRGS and a member of the research project, says that the first stage was based on monitoring the cycle of a cell line grown with the tumor. This means that the copy of a human cell already with cancer was observed throughout its life until apoptosis – a scientific term for programmed cell death.

The second stage involved testing on animals. The tumor cells were injected into 23 mice that were divided into two groups: one received treatment, and the other did not. The objective of the experiment was to monitor the growth of tumors in both situations and to assess whether the object of research had the desired result. The resource used was a drug that inhibits the protein receptor that generates cell multiplication – the process that makes cancer such a difficult disease to be treated. Mariane explained the study through a metaphor: It is as if the cells have antennas that capture signals. One of the antennas is called TRKB, and the signal it captures is the BDNF protein, responsible for cell multiplication. It is this signal, therefore, that must be inhibited. So, to make the TRKB antenna no longer capture the BDNF signal, a drug called ANA-12 is used, originally developed by French researchers as an anxiolytic and antidepressant and which, in this experiment, presents another possible application. Mice treated with the drug showed good results. They had a low proliferation of tumor cells and, therefore, less growth of tumors in their bodies.

### What the results mean

The study lasted approximately two years and represents the possibility of an alternative for the treatment of childhood brain cancers of the medulloblastoma type. Data from the Central Registry of Brain Tumors of the United States (CBTRUS) reveal that, among the types of brain tumors in children, those related to medulloblastoma are the ones with the lowest survival rate within a five-year period after diagnosis – only 60% to 65% of the patients survive after this period.

Mariane explained that the specific compound used in the experiment cannot be tested on humans, but the established mechanism and the idea of the study have great prospects. A similar treatment, under the same biological principle as the research here described, was approved for use in November 2018 by the U. S. Food and Drug Administration (FDA), the U. S. government agency responsible for controlling food and medicines. Vitrekvi medication (larotrectinib) is targeted at tumors of the same type as medulloblastoma, those involving the TRK gene.

Roesler also pointed out that the study was only possible thanks to the financial support from the Childhood Cancer Institute, from the National Program for Oncological Care (Pronon), from the National Council for Scientific and Technological Development (CNPq), from the Research Assistance Foundation from the Rio Grande do Sul State (Fapergs) and from the Coordination for the Improvement of Higher Education Personnel (Capes).

### Scientific article

THOMAZ, Amanda et al. [Antitumor activities and cellular changes induced by TrkB inhibition in medulloblastoma](#). *Frontiers in Pharmacology*, Jun. 26 2019.

*Translated into English by Marcos Viola Cardoso, under the supervision and translation revision of Elizamari R. Becker (P.h.D.) – IL/UFRGS.*

